RELATION

A WHAT IS A RELATION?

A.1 VARIABLES IN SCIENCES

MCQ 1: We study the growth of a plant over different months of the year.
Choose the two variables:

- ☐ d: length in km.
- ☒ t: time in months.
- ☐ v: speed in km/h.
- ☐ v: volume of soil in m^3.
- ☐ T: temperature in degrees.
- ☒ h: height of the plant in cm.

Answer:

- t: time in months.
- h: height of the plant in cm.

MCQ 2: We monitor the daily temperature changes over a month.
Choose the two variables:

- ☐ d: length in km.
- ☐ v: speed in km/h.
- ☒ t: time in days.
- ☒ T: temperature in degrees.
- ☐ v: volume of water in m^3.
- ☐ h: height in cm.

Answer:

- t: time in days.
- T: temperature in degrees.

MCQ 3: We track the daily sales in a store over a month.
Choose the two variables:

- ☒ t: time in days.
- ☐ d: length in km.
- ☐ v: speed in km/h.
- ☐ v: volume of stock in m^3.
- ☐ T: temperature in degrees.
- ☒ s: sales amount in dollars.

Answer:

- t: time in days.
- s: sales amount in dollars.

MCQ 4: We measure the growth of a bacterial culture over a period of time.
Choose the two variables:

- ☐ d: length in km.
- ☐ v: speed in km/h.
- ☒ t: time in hours.
- ☒ n: number of bacteria.
- ☐ v: volume of liquid in m^3.
- ☐ T: temperature in degrees.

Answer:

- t: time in hours.
- n: number of bacteria.

MCQ 5: We study the amount of rain we get in different months of the year.
Choose the two variables:

- ☐ d: length in km.
- ☐ v: speed in km/h.
- ☒ t: time in months.
- ☐ V: volume of sunscreen in m^3.
- ☒ h: height of rainfall in a graduated glass in cm.
- ☐ T: temperature in degrees.

Answer:

- t: time in months.
- h: height of rainfall in a graduated glass in cm.

B TABLES

B.1 READING TABLES

Ex 6: For this relation:

x	0	1	2	3	4	5
y	3	3	2	4	5	4

Find the value of y when $x = 3$.

$$y = \boxed{4}$$

Answer: When $x = 3$, $y = 4$.

Ex 7: For this relation:

x	1	2	3	4	5	6
y	4	5	6	7	8	9

Find the value of x when $y = 8$.

$$x = \boxed{5}$$

Answer: When $y = 8$, $x = 5$.

Ex 8: For this relation:

x	0	1	2	3	4	5
y	1.5	2.5	3.0	4.5	5.5	6.0

Find the value of y when $x = 2$.

$$y = \boxed{3.0}$$

Answer: When $x = 2$, $y = 3.0$.

Ex 9: For this relation:

x	1	2	3	4	5	6
y	1	4	9	16	25	36

Find the value of x when $y = 16$.

$$x = \boxed{4}$$

Answer: When $y = 16$, $x = 4$.

Ex 10: For this relation:

x	0.5	1.5	2.5	3.5	4.5	5.5
y	2.0	2.5	3.5	4.0	4.5	5.0

Find the value of y when $x = 3.5$.

$$y = \boxed{4.0}$$

Answer: When $x = 3.5$, $y = 4.0$.

B.2 READING TABLES IN SCIENCES

Ex 11: Consider a table that shows the relationship between Hugo's age (in years) and his height (in centimeters).

Hugo's Age (years)	5	6	7	8
Hugo's Height (cm)	110	116	122	128

1. What is Hugo's height at 5 years old?

   $\boxed{110}$ cm.

2. At what age was Hugo's height 122 cm?

   $\boxed{7}$ years.

Answer:

1. Hugo's height at 5 years old is 110 cm.
2. Hugo's height was 122 cm when he was 7 years old.

Ex 12: Consider a table that shows the relationship between speed (in km/h) and distance traveled (in km).

Speed (km/h)	40	50	60	70
Distance (km)	80	100	120	140

1. What is the distance traveled at a speed of 50 km/h?

   $\boxed{100}$ km.

2. At what speed was the distance 120 km?

   $\boxed{60}$ km/h

Answer:

1. The distance traveled at a speed of 50 km/h is 100 km.
2. The speed was 60 km/h for a distance of 120 km.

Ex 13: Consider a table that shows the relationship between time (in hours) and temperature (in °C).

Time (hours)	10	11	12	13
Temperature (°C)	22	24	24	23

1. What is the temperature at 10 o'clock?

   $\boxed{22}$°C.

2. At what times was the temperature 24°C?

   $\boxed{11}$ o'clock and $\boxed{12}$ o'clock

Answer:

1. The temperature at 10 o'clock is 22°C.
2. The temperature was 24°C at 11 o'clock and 12 o'clock.

Ex 14: Consider a table that shows the relationship between the temperature (in °C) and the number of ice creams sold.

Temperature (°C)	20	22	24	26
Ice Creams Sold	50	75	100	150

1. How many ice creams were sold at 24°C?

   $\boxed{100}$.

2. At what temperature were 150 ice creams sold?

   $\boxed{26}$ degrees Celsius.

Answer:

1. At 24°C, 100 ice creams were sold.
2. 150 ice creams were sold at a temperature of 26°C.

Ex 15: Consider a table that shows the relationship between the price of a book (in dollars) and the number of books sold.

Price ($)	10	12	15	20
Books Sold	120	100	80	60

1. How many books were sold at a price of $15?

   $\boxed{80}$.

2. At what price were 60 books sold?

   $\$\boxed{20}$.

Answer:

1. At a price of $15, 80 books were sold.
2. 60 books were sold at a price of $20.

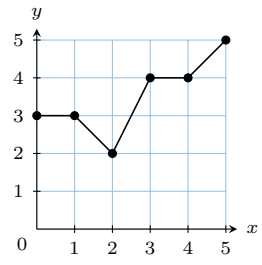
C GRAPHS

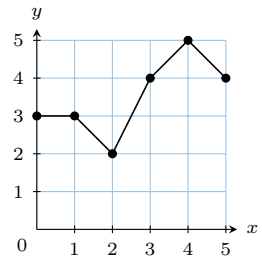
C.1 IDENTIFYING LINE GRAPHS

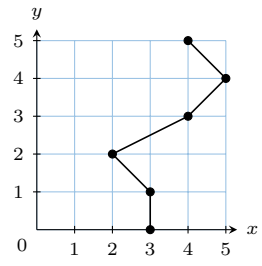
MCQ 16: For this relation:

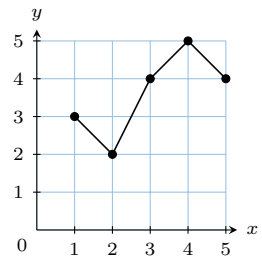
x	0	1	2	3	4	5
y	3	3	2	4	5	4

Choose the line graph.

☐ 

☒ 

☐ 

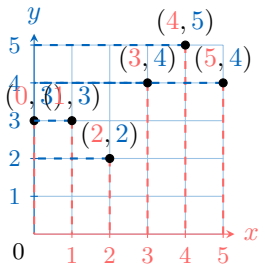
☐ 

Answer:

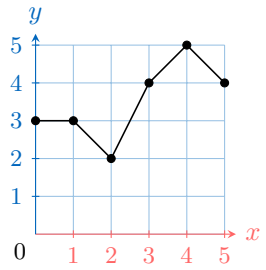
- The horizontal axis is the x-axis. The vertical axis is the y-axis.

x	0	1	2	3	4	5
y	3	3	2	4	5	4

- Plot the points



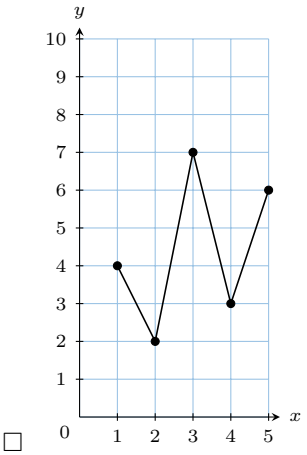
- Connect the points

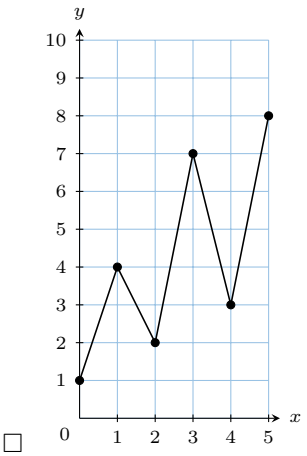


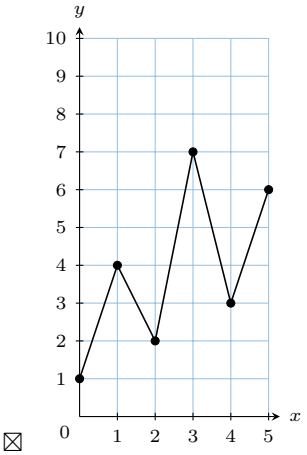
MCQ 17: For this relation:

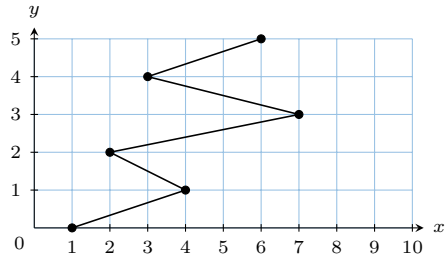
x	0	1	2	3	4	5
y	1	4	2	7	3	6

Choose the graph.

☐ 

☐ 

☒ 

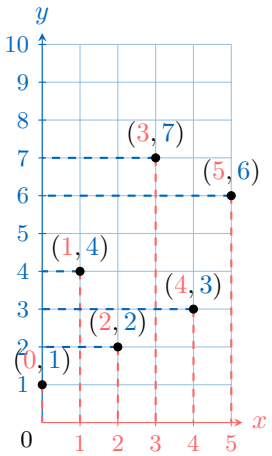


Answer:

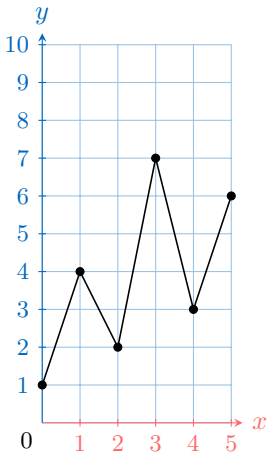
- The horizontal axis is the x-axis. The vertical axis is the y-axis.

x	0	1	2	3	4	5
y	1	4	2	7	3	6

- Plot the points



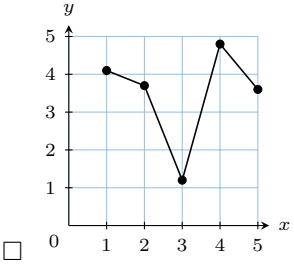
- Connect the points

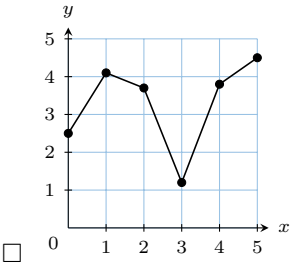


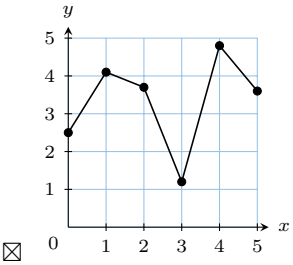
MCQ 18: For this relation:

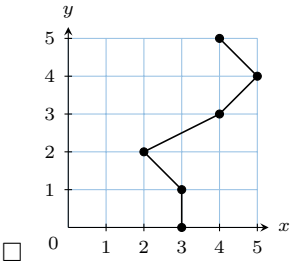
x	0	1	2	3	4	5
y	2.5	4.1	3.7	1.2	4.8	3.6

Choose the graph.







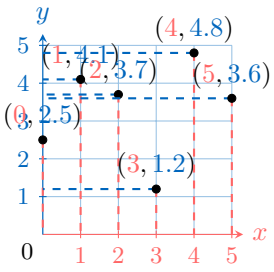


Answer:

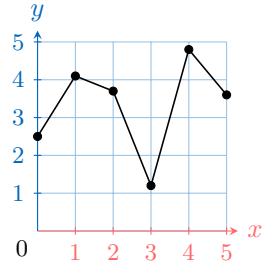
- The horizontal axis is the x-axis. The vertical axis is the y-axis.

x	0	1	2	3	4	5
y	2.5	4.1	3.7	1.2	4.8	3.6

- Plot the points



- Connect the points

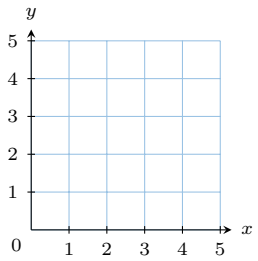


C.2 PLOTTING LINE GRAPHS

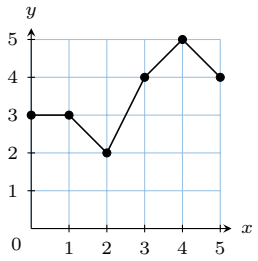
Ex 19:

x	0	1	2	3	4	5
y	3	3	2	4	5	4

Plot these points and connect them with line segments on a coordinate plane.



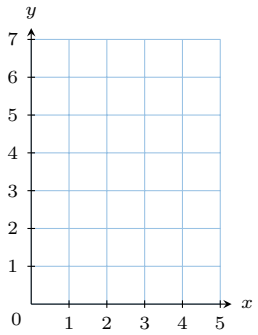
Answer:



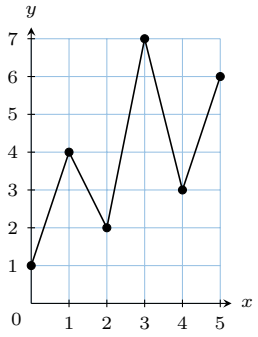
Ex 20:

x	0	1	2	3	4	5
y	1	4	2	7	3	6

Plot these points and connect them with line segments on a coordinate plane.



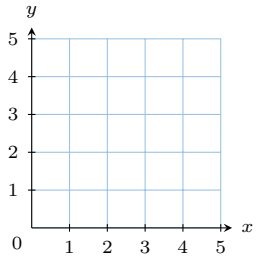
Answer:



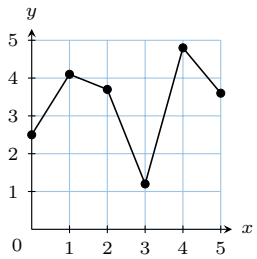
Ex 21:

x	0	1	2	3	4	5
y	2.5	4.1	3.7	1.2	4.8	3.6

Plot these points and connect them with line segments on a coordinate plane.

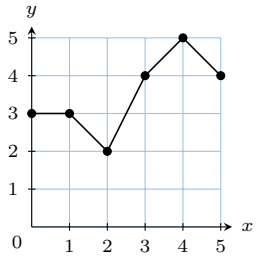


Answer:



C.3 READING LINE GRAPHS

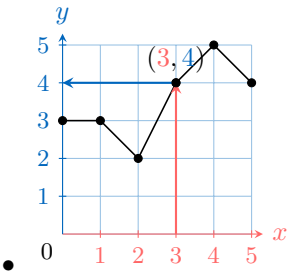
Ex 22: For this graph,



Find the value of y when $x = 3$.

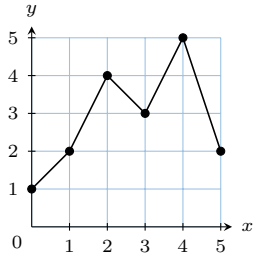
$y = \boxed{4}$

Answer:



- When $x = 3$, $y = 4$.

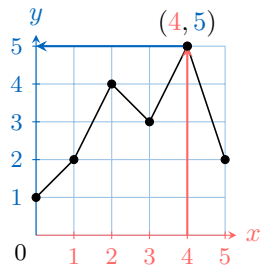
Ex 23: For this graph,



Find the value of y when $x = 4$.

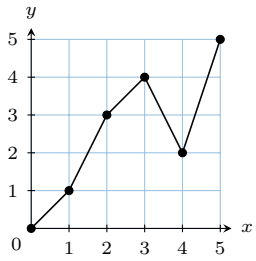
$y = \boxed{5}$

Answer:



- When $x = 4$, $y = 5$.

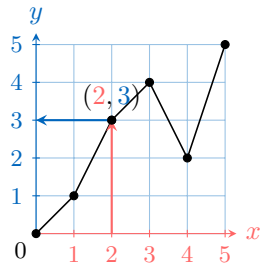
Ex 24: For this graph,



Find the value of y when $x = 2$.

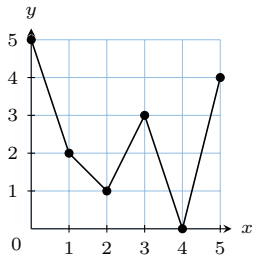
$$y = \boxed{3}$$

Answer:



- When $x = 2$, $y = 3$.

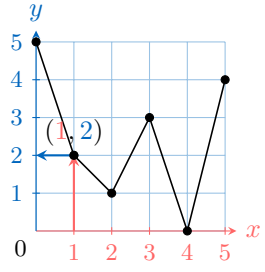
Ex 25: For this graph,



Find the value of y when $x = 1$.

$$y = \boxed{2}$$

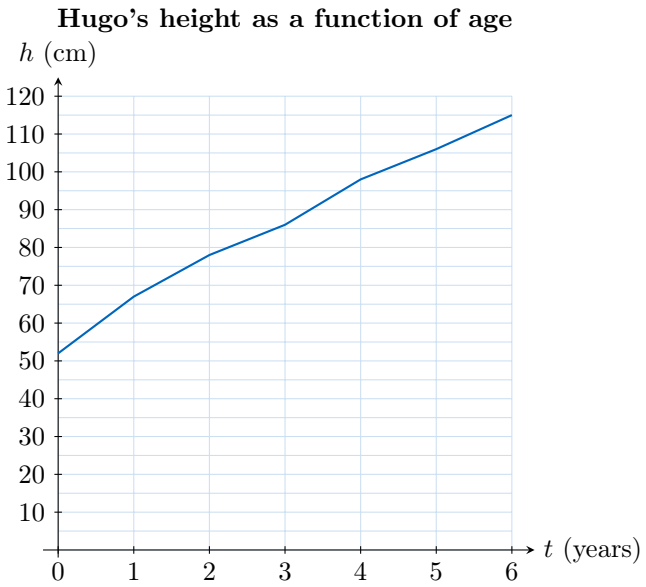
Answer:



- When $x = 1$, $y = 2$.

C.4 READING VALUES FROM A GRAPH

Ex 26:

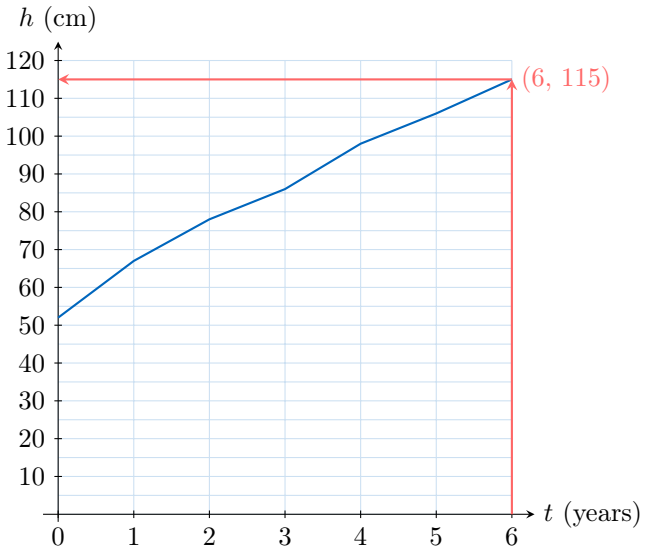


Find Hugo's height at $t = 6$ years using the graph:

$$\boxed{115} \text{ cm}$$

Answer:

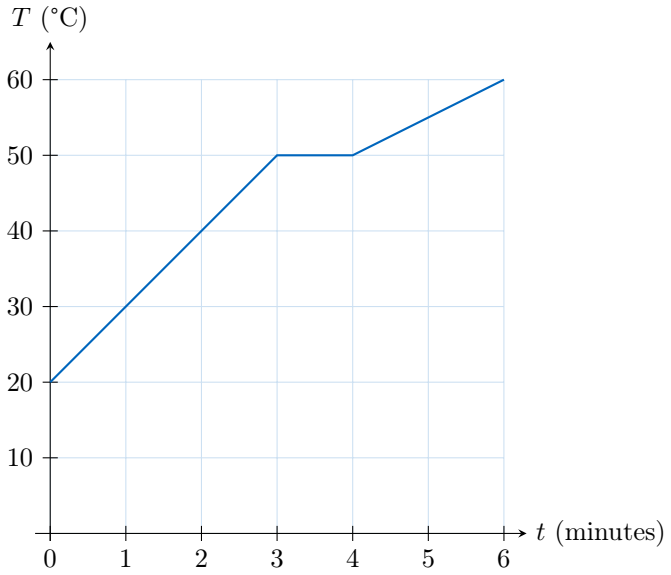
- **Move vertically to the graph:** Draw a vertical line from $t = 6$ up to the plotted point on the graph.
- **Read the h-value:** At the intersection, read the corresponding height h on the vertical axis.



So, Hugo's height at 6 years is $h = 115$ cm.

Ex 27:

Water temperature as a function of time

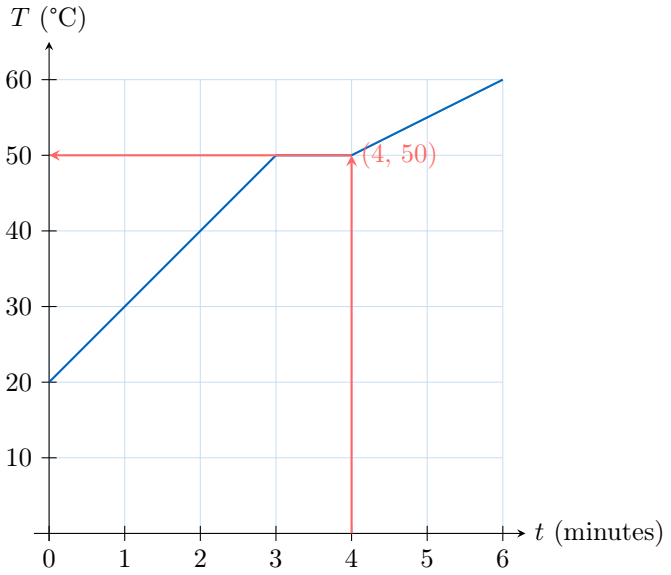


What is the water temperature at $t = 4$ minutes according to the graph?

$\boxed{50}$ °C

Answer:

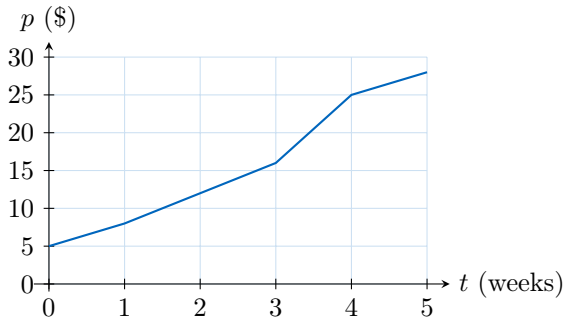
- **Move vertically to the graph:** Draw a vertical line from $t = 4$ up to the plotted point.
- **Read the T-value:** At the intersection, read the temperature T on the vertical axis.



So, the water temperature at $t = 4$ minutes is $T = 50$°C.

Ex 28:

Pocket money saved over weeks

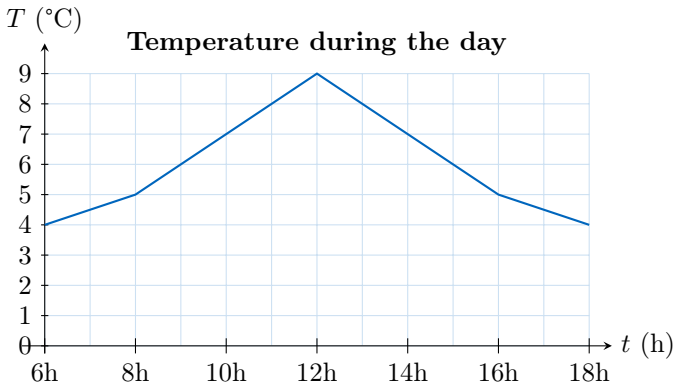


How much money did Kim save after 4 weeks?

$\boxed{25}$ $

Answer: At $t = 4$ weeks, Kim has saved $p = 25$ $.

Ex 29:



What was the temperature at 12h?

$\boxed{9}$ °C

Answer: At $t = 12$h, the temperature was $T = 9$ °C.